

1 **WE CLAIM:**

2

3 1. A process comprising:

4 heating to a first polymerization temperature a first mixture comprising a free
5 radical polymerizable monomer, a free radical initiator, and a stable free radical
6 compound to polymerize only a portion of the monomer, resulting in a prepolymer
7 composition;

8 shearing a second mixture including the prepolymer composition, a continuous
9 phase liquid, and a stabilizing compound to create a miniemulsion; and

10 flowing the miniemulsion within a polymerization reactor and heating the
11 miniemulsion at a second polymerization temperature to form polymeric particles
12 wherein the formation of the polymeric particles occurs while the miniemulsion flows
13 within the reactor.

14

15 2. The process of claim 1, wherein the miniemulsion is subjected to a pressure
16 ranging from about 100 to about 600 kPa while the miniemulsion flows within the
17 reactor.

18

19 3. The process of claim 1, wherein the first polymerization temperature ranges
20 from about 100 to about 145 degrees C.

21

22 4. The process of claim 1, wherein the second polymerization temperature ranges
23 from about 100 to about 145 degrees C.

24

25 5. The process of claim 1, wherein the reactor is a tubular-flow reactor.

26

27 6. The process of claim 1, wherein the miniemulsion flows within the reactor at
28 a volumetric flowrate of about 0.1 to about 10 ml/minute.

29

30 7. The process of claim 1, wherein the heating of the first mixture and the
31 shearing of the second mixture are accomplished in a batch mode to provide a batch
32 amount of the miniemulsion.

33

34 8. The process of claim 1, wherein the heating of the first mixture and the
35 shearing of the second mixture are accomplished in a continuous mode to provide a
36 continuous amount of the miniemulsion.

1
2 9. The process of claim 1, wherein the heating the first mixture is ended when
3 about 1 to about 50% of the monomer is polymerized.
4

5 10. The process of claim 1, wherein the polymeric particles includes a compound
6 exhibiting a molecular weight polydispersity of from about 1.1 to about 3.0.
7

8 11. The process of claim 1, wherein the continuous phase liquid is water.
9

10 12. The process of claim 1, wherein the polymeric particles have a volume
11 average diameter of from about 25 nanometers to about 1 micrometer.
12

13 13. The process of claim 1, wherein the first mixture further includes a co-
14 monomer.
15

16 14. A process comprising:

17 heating to a first polymerization temperature a first mixture comprising a first
18 free radical polymerizable monomer, a first free radical initiator, and a first stable free
19 radical compound to polymerize only a portion of the first monomer, resulting in a
20 prepolymer composition;

21 shearing a second mixture including the prepolymer composition, a continuous
22 phase liquid, and a stabilizing compound to create a miniemulsion; and

23 flowing the miniemulsion within a polymerization reactor and heating the
24 miniemulsion at a second polymerization temperature to form polymeric particles
25 wherein the formation of the polymeric particles occurs while the miniemulsion flows
26 within the reactor,

27 wherein there is added to the second mixture, the miniemulsion, or both the
28 second mixture and the miniemulsion at any time prior to the formation of the
29 polymeric particles a second free radical initiator, a second free radical polymerizable
30 monomer, and an optional second stable free radical compound, wherein at least one of
31 the second initiator and the second monomer includes a functional group, wherein the
32 polymeric particles each includes a compound with the functional group covalently
33 bound and with the functional group disposed on the particle surface.
34

35 15. The process of claim 14, wherein the first stable free radical compound and
36 the second stable free radical compound are the same.

1
2 16. The process of claim 14, wherein the second initiator includes the
3 functional group.

4
5 17. The process of claim 14, wherein the second monomer includes the
6 functional group.

7
8 18. The process of claim 14, wherein the second initiator includes the
9 functional group and the second monomer includes the same or different functional
10 group.

11
12 19. The process of claim 14, wherein the first mixture further includes a co-
13 monomer.